

Specific Factors Model: Example

- ▶ 2 goods: Cloth (C), Soy (S)
- ▶ 3 factors: Kapital (K), Land (T), Labor (L)
- ▶ Production:
 - ▶ Cloth: K specific to C. $c = f(K, L)$. Think of $c = K^{1/2}L^{1/2}$.
 - ▶ Soy: T specific to S. $s = g(T, L)$. Think of $s = T^{1/2}L^{1/2}$.
- ▶ Key Point: **If get more T then MPL_s increases** because
 $MPL_s = (1/2)T^{1/2}L_s^{-1/2}$ and
 $dMPL_s/dT = (1/4)T^{-1/2}L_s^{-1/2} > 0$.

General Equilibrium

- ▶ Remember we are looking for a GE. So we need to do these 3 steps:
 - ▶ Producer Equilibrium: Draw PPF and find production point.
 - ▶ Consumer Equilibrium: Draw IC map and find consumption point.
 - ▶ Market Clearing: Goods Markets and Factor Markets.
 - ▶ Goods markets: Same as earlier. Demand = Supply.
 - ▶ Labor Market: $\bar{L} = L_c + L_s$.
 - ▶ Kapital Market: $\bar{K} = K_c$.
 - ▶ Land Market: $\bar{T} = T_s$.

Producer Equilibrium: PPF

1. Think of the Cobb-Douglas production functions.
 $c = K^{1/2}L^{1/2}$ and $s = T^{1/2}L^{1/2}$. Suppose $\bar{K} = 1$, $\bar{T} = 100$ and $\bar{L} = 100$.
2. **Find the maximum points:** Give all resources to C. The maximum $c = 1^{1/2}1^{1/2} = 1$. Give all resources to S. The maximum $s = 100^{1/2}1^{1/2} = 10$.
 - 2.1 So we know two points on the PPF. $(s, c) = (0, 1)$ and $(s, c) = (10, 0)$. Notice that K and T are useless without L .
3. **On the PPF.** $MPK_c > 0$ and $MPT_s > 0$. So output increases with more of K in C and more of T in S.
 - 3.1 Implies all points on the PPF use all \bar{K} , \bar{T} .

Producer Equilibrium: PPF

- Slope of PPF.** $MPL_C = (1/2)K^{1/2}L^{-1/2} > 0$.
 $MPL_S = (1/2)T^{1/2}L^{-1/2} > 0$. So MPL is positive. Implies the PPF is **downward-sloping**.
 - 1.1 As you give more labor to S , you have to reduce the labor allocated to C .
- Shape of PPF.** $dMPL_C/dL = -(1/4)K^{1/2}L^{-3/2} < 0$ and $dMPL_S/dL = -(1/4)T^{1/2}L^{-3/2} < 0$. So MPL is decreasing. Implies the PPF is **concave**.
 - 2.1 As you give more and more labor to S , the output increases more and more slowly.

General Equilibrium

1. Draw the IC map. (S is on the horizontal axis).
2. Find the **tangency between PPF and IC map**.
3. The slope at this point is the **price ratio** P_s/P_c .
4. Implies $MRT = P_s/P_c = MRS$.
5. Goods Market Clearing: **Prod = Cons** (because of tangency) so goods markets clear.
6. Factor Market Clearing: **On the PPF** (because of $MPL > 0$, $MPK_c > 0$ and $MPT_s > 0$).

Factor Rewards

In a competitive equilibrium, all output is exhausted in rewards paid to factors.

$$P_s Q_s = w L_s + r_T T_s$$

This implies

$$P_s = w(L_s/Q_s) + r_T(T_s/Q_s)$$

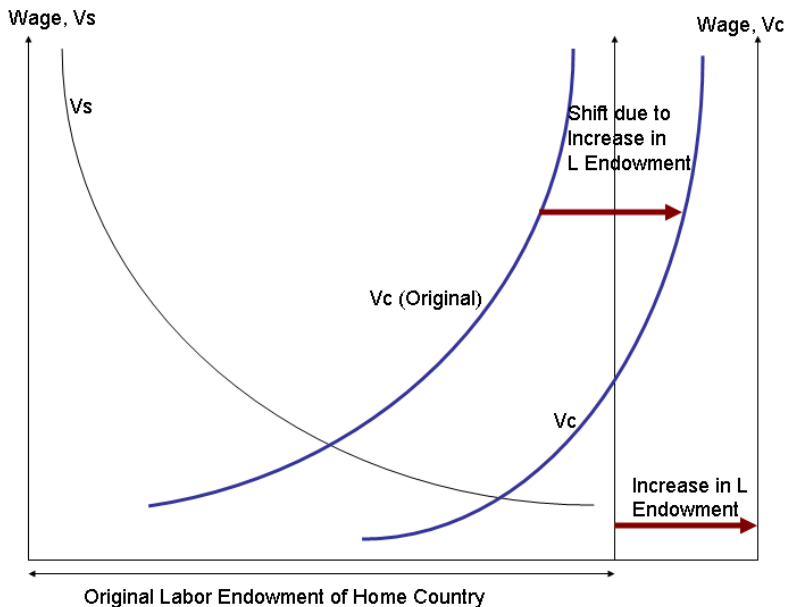
$$P_s = w a_{Ls} + r a_{Ts}$$

So price is a weighted average of wage and rent paid to the fixed factor. The weights a_{Ls} and a_{Ts} correspond to the unit labor requirement and unit land requirement respectively.

The same holds in the Cloth sector too.

Some Useful Comparative Statics

Increase in Labor Endowment of the Home Country:



Some Useful Comparative Statics

Fall in Land Endowment of the Home Country: Depending on problem MPL falls implying VMPL shifts down.

